WHAT IS CLAIMED IS:

1. A method for producing a semiconductor substrate, comprising the steps:

forming a first patterned mask containing a material having a growth suppressing effect on a lower substrate;

growing a semiconductor crystal on the lower substrate via the first patterned mask to form a first semiconductor crystal layer;

forming a second patterned mask containing a material having a growth suppressing effect on or above the lower substrate, the second patterned mask at least having a surface which is positioned at a level different from a level of a surface of the first patterned mask, with respect to a surface of the lower substrate; and

growing a semiconductor crystal on or above the lower substrate via the second patterned mask to form a second semiconductor crystal layer.

2. A method for producing a semiconductor substrate according to claim 1, wherein the second patterned mask is positioned on the first semiconductor crystal layer.

3. A method for producing a semiconductor substrate according to claim 1, wherein the first and second patterned masks are patterned in such a manner that a combination of the first and second patterned masks covers the entire surface of the lower substrate, and an area of the lower substrate covered with the second patterned mask is larger than an area of the lower substrate covered with the first patterned mask.

4. A method for producing a semiconductor substrate according to claim 1, wherein the second patterned mask includes a first portion and a second portion, the first and second portions have different widths in a direction vertical to the surface of the lower substrate, and the step of forming the first semiconductor crystal layer and the step of forming the second semiconductor crystal layer are conducted during the same crystal growth step.

5. A method for producing a semiconductor substrate according to claim 4, wherein the first portion of the second patterned mask is at least partially positioned on the first patterned mask, and the second patterned mask has an L-shape.

6. A method for producing a semiconductor substrate according to claim 5, wherein the first portion of the second patterned mask is at least partially positioned on the lower substrate, and the second patterned mask has a T-shape.

7. A method for producing a semiconductor substrate according to claim 1, wherein a growth direction of the second semiconductor crystal layer is at least partially different from a growth direction of the first semiconductor crystal layer.

8. A method for producing a semiconductor substrate according to claim 1, wherein the first semiconductor crystal layer is formed in the vicinity of openings in the first patterned mask, whereby the first semiconductor crystal layer has openings on the lower substrate and the first patterned mask.

9. A method for producing a semiconductor substrate according to claim 1, wherein the lower substrate includes a sapphire substrate and a lower semiconductor crystal layer provided on an upper side of the sapphire substrate in a crystal growth direction.

10. A method for producing a semiconductor substrate according to claim 1, wherein the material having a growth suppressing effect is selected from the group consisting of SiO_2 and SiN_x, and the first and second patterned masks are independently selected from the group consisting of SiO_2 and SiN_x.

11. A method for producing a semiconductor substrate according to claim 1, wherein the first and second semiconductor crystal layers are selected from the group consisting of GaN, InGaN, and AgGaN.

12. A semiconductor substrate, comprising:

a first patterned mask containing a material having a growth suppressing effect, provided on a lower substrate;

a first semiconductor crystal layer grown on the lower substrate via the first patterned mask;

a second patterned mask containing a material having a growth suppressing effect, provided on or above the lower substrate, at least having a surface which is positioned at a level different from a level of a surface of the first patterned mask, with respect to a surface of the lower substrate; and

a second semiconductor crystal layer grown on or above the lower substrate via the second patterned mask.

13. A method for producing a semiconductor substrate, comprising the steps of:

forming an n-th patterned mask containing a material having a growth suppressing effect on or above a lower substrate, wherein n is an integer of 1 or more;

growing a nitride semiconductor crystal on or above the lower substrate via the n-th patterned mask to form an n-th nitride semiconductor crystal layer;

forming an (n+1)-th patterned mask containing a material having a growth suppressing effect on or above the lower substrate, the (n+1)-th patterned mask at least having a surface which is positioned at a level different from a level of a surface of the n-th patterned mask, with respect to a surface of the lower substrate; and

growing a nitride semiconductor crystal on or above the lower substrate via the (n+1)-th patterned mask to form an (n+1)-th nitride semiconductor crystal layer.

14. A method for producing a semiconductor substrate according to claim 13, wherein the first to (n+1)-th patterned masks are patterned in such a manner that a

combination of the first to(n+1)-th patterned masks covers the entire surface of the lower substrate.

15. A method for producing a semiconductor substrate according to claim 13, wherein the n-th patterned mask and the (n+1)-th patterned mask are respectively patterned in a stripe shape, and a direction of the stripe of the n-th patterned mask is twisted from a direction of the stripe of the (n+1)-th patterned mask.

16. A method for producing a semiconductor substrate according to claim 15, wherein the direction of the stripe of the n-th patterned mask and the direction of the stripe of the (n+1)-th patterned mask have an angle difference of about 120°.

17. A method for producing a semiconductor substrate according to claim 15, wherein the direction of the stripe of the n-th patterned mask and the direction of the stripe of the (n+1)-th patterned mask have an angle difference of about 90°.

18. A method for producing a semiconductor substrate according to claim 15, wherein a width of the stripe of

the (n+1)-th patterned mask is equal to or larger than a width of the stripe of the n-th patterned mask.

19. A method for producing a semiconductor substrate according to claim 13, wherein the material having a growth suppressing effect is made of SiO_2 or SiN_x, and the first to (n+1)-th patterned masks are independently made of SiO_2 or SiN_x.

20. A method for producing a semiconductor substrate according to claim 15, wherein the lower substrate includes at least a lower nitride semiconductor crystal layer provided on an upper surface of the lower substrate, and a direction of the stripe of the n-th patterned mask is equal to a <1-100> direction or a <11-20> direction of a crystal of the nitride semiconductor crystal layer.

21. A method for producing a semiconductor substrate according to claim 15, wherein the lower substrate includes at least a lower nitride semiconductor crystal layer provided on an upper side of the lower substrate in a crystal growth direction, the semiconductor substrate includes the first, second and third nitride semiconductor crystal layers, and a combination of directions of the

first, second and third patterned masks consists of a combination of [1-100], [10-10], and [01-10] directions of a crystal of the nitride semiconductor crystal.

22. A method for producing a semiconductor substrate according to claim 13, wherein the n-th nitride semiconductor crystal layer is made of $Al_xIn_yGa_zN$ (where $x+y+z=1$, $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$, and $0 \leqq z \leqq 1$).

23. A method for producing a semiconductor substrate according to claim 13, wherein the n-th nitride semiconductor crystal layer or the (n+1)-th nitride semiconductor crystal layer has a thickness of about 5 μm or more.

24. A method for producing a semiconductor substrate according to claim 13, wherein the lower substrate includes a substrate body and a lower nitride semiconductor crystal layer provided on an upper side of the substrate body in a crystal growth direction,

the method further comprising the step of removing at least the substrate body from a crystal structure including the (n+1)-th nitride semiconductor crystal layer after the step of forming the (n+1)-th nitride

semiconductor crystal layer.

25. A semiconductor substrate, comprising:

an n-th patterned mask containing a material having a growth suppressing effect provided on or above a lower substrate, wherein n is an integer of 1 or more;

an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;

an (n+1)-th patterned mask containing a material having a growth suppressing material provided on or above the lower substrate, the (n+1)-th mask at least having a surface which is positioned at a level different from a level of a surface of the n-th mask, with respect to a surface of the lower substrate; and

an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask.

26. A light-emitting device produced by using the semiconductor substrate of claim 25.

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